METHOD FOR COATING A COMPONENT FOR PAINTING MADE FROM FIBRE-REINFORCED PLASTIC

BACKGROUND OF THE INVENTION

Field of the invention

[0002] The invention concerns a process for coating fiber-reinforced plastic components, which are subsequently painted.

Related Art of the Invention

[0003] This type of component is finding greater application, for example in automobile construction, since fiber reinforced plastic parts are easily deformable and above all have a low weight in comparison to other materials of like stability.

[0004] One problem occurring in the automobile industry relates to the high premium placed upon optical appearance, the problem being the surface characteristic of fiber-reinforced plastic components. Due to the fibers situated in the plastic fiber, signatures, pores and other imperfections can occur on the component surface, which are visible after application of the paint. These imperfections occur in particular where the components are produced in a press, and imprints on the components must subsequently be removed mechanically by grinding or planning or milling or the like.

[0005] For overcoming these problems, a substantial investment in the form of grinding of the surface and/or multiple coatings must be made.

[0006] DE 19628966 C1 shows a process for application of a paint film upon a three dimensional curved surface. A coating of this film in the course of a normal painting process is

however problematic, since the production of a continuous even optical appearance is achievable only with difficulty. Thus, for this reason, in the process according to the above mentioned document, an already finished painted film is applied upon the component.

SUMMARY OF THE INVENTION

[0007] The present invention is concerned with the task of developing a process in which blemishes on components of fiber reinforced plastic can be avoided without detracting from the subsequent painting.

[0008] The solution of this task is proposed by a process having the characteristics of Patent Claim 1.

[0009] With the polymer, the pores and other blemishes of the surface of the component are evened-out or smoothed out or, as the case may be, covered. The two-stage cross-linking and hardening process provides the possibility to first fix the polymer by a first cross-linking, and then to later carry out the final hardening in a separate step, which in a time saving manner can be combined with other processing steps. While the polymer does not exhibit the hardness necessary for operations following cross-linking of the polymer, it is at least fixed in location on the component. The polymer exhibits a sufficient stability or stiffness, so that gasses emitted from the substate do not lead to blisters, boils, etc. At the same time, the surface of the component is protected from damage until the final painting.

[00010] It is advantageous to have the final hardening of the, in certain cases electrically conductive, polymer occur during electrostatic painting, so that the total production time can be reduced. The hardening occurs as a result of the temperature during painting.

[00011] Electrically conductive substances contained in the polymer make possible an electrostatic painting of plastics which are themselves not electrically conductive.

[00012] In one advantageous embodiment of the process, the final cross-linking of the polymer occurs prior to the cathodic dip coating carried out by electrostatic painting (electrophoretic painting), which for cost reasons as well as for reasons of environment protection are increasingly employed in automobile construction.

[00013] According to a further refinement of the process, the prepolymer is first preprocessed into a "film pre-form" which can be produced in great amounts, stored, and when needed be applied upon a component.

[00014] In one alternative process step the polymer can also be provided directly upon the component to be coated, whereby a process step can be saved.

[00015] When covering over of the edges of the component to be coated by the polymer, in advantageous manner further measures for protecting the edge can be omitted.

[00016] It is further advantageous to carry out the cross-linking of the prepolymer by means of electromagnetic waves and thus "cold", in order to prevent the formation of bubbles during cross-linking and in order to provide a surface as free of blemishes as possible.

[00017] Further advantages and characteristics of the invention can be found in the following description of the process as well as the individual patent claims.

[00018] In the automobile industry, when using fiber reinforced plastic components in visible areas, there is the problem that blemishes (missing paint) and pores can occur on the surface of the component as a result of the ends of the fibers of the fiberglass reinforcement occurring on the surface. In order to remove the need for further mechanical follow-up processing of these surfaces these are covered over with a plastic layer.

[00019] Polymer formulations based on polyurethane, polyester or polyacrylic acid have been found to be particularly suitable therefore.

[00020] The polymer material is extruded and either directly applied to the plastic component to be coated or is first processed into a foil or thin sheet in the form of a flat intermediate or perform, and then is applied to the component in a subsequent step.

[00021] In both processes the cross-linking of the polymers occurs during or after extruding. The production of a cross-

linked film has the advantage, in contrast to the direct application on the component, of being able to be stored, but however requires a further processing step.

[00022] The energy input for cross-linking occurs in such a manner that an increase in the temperature thereof, which could lead to the later formation of optically detracting bubbles or blisters, is avoided. A radiation with electromagnetic waves, for example in the form of UV-light, has been found to be particularly advantageous, wherein it is however also naturally possible to subject the polymer to a short-time thermal increase.

[00023] If a cross-linked film of a prepolymer is applied to a plastic component, it adheres thereto on the basis of adhesion forces. A stronger bond between the polymer and the plastic component can be formed by curing.

[00024] Whether using a film produced first as an intermediate, as well as in the direct application of extruded polymer upon the plastic component, in certain cases existing edges are covered over with the polymer layer. In this manner further measures to protect the edges are no longer necessary.

[00025] In order to paint or coat the polymer layer situated on the surface of the coated plastic component in an even manner, the polymers can already, prior to being extruded, have added thereto electrically conductive substances such as carbon black or aluminum particles. Thereby there is in any case provided the possibility to coat the polymer layer with an electrostatic paint. These electrostatic paints can also be

cataphoretic paints, wherein the curing of the polymer could occur prior to the painting process, for example, by UV-radiation or also during cataphoretic painting. The provision of a supplemental primer layer for preparation for painting is unnecessary in accordance with the inventive process.

[00026] In place of the electrically conductive particles added-in to the polymer, it is also possible to employ an electrically conductive polymer.